

Europäisches Patentamt
European Patent Office
Office européen des brevets



(11) **EP 1 341 042 A3**

(12) **EUROPEAN PATENT APPLICATION**

(88) Date of publication A3:
31.03.2004 Bulletin 2004/14

(51) Int Cl.7: **G03F 7/20**, H01L 21/00,
G03F 9/00

(43) Date of publication A2:
03.09.2003 Bulletin 2003/36

(21) Application number: **03003288.2**

(22) Date of filing: **24.02.2003**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HU IE IT LI LU MC NL PT SE SI SK TR
Designated Extension States:
AL LT LV MK RO

(30) Priority: **22.02.2002 US 358354 P**
15.03.2002 US 364129 P
30.09.2002 US 414358 P

(71) Applicant: **ASML Holding N.V.**
5503 LA Veldhoven (NL)

(72) Inventors:
• **Del Puerto, Santiago**
Milton, New York 12547 (US)

- **Massar, Andrew**
Monroe, Connecticut 06468 (US)
- **Alikhan, Abdullah**
Danbury, Connecticut 06811 (US)
- **Feroce, Jonathan H.**
Shelton, Connecticut 06484 (US)
- **Loopstra, Eric R.**
5591 BA Heeze (NL)
- **Kish, Duane P.**
Danbury, Connecticut 06811 (US)
- **Olson, Woodrow J.**
Stamford, Connecticut 06903 (US)

(74) Representative: **Grünecker, Kinkeldey,**
Stockmair & Schwanhäusser Anwaltssozietät
Maximilianstrasse 58
80538 München (DE)

(54) **System and method for using a two part cover for protecting a reticle**

(57) A system and method are used to protect a mask from being contaminated by airborne particles. They include providing a reticle secured in a two-part cover. The two part cover includes a removable protection device used to protect the reticle from contaminants. The cover can be held inside a pod or box that can be used to transport the cover through a lithography system from an atmospheric section to a vacuum section. While in the vacuum section, the removable cover can be moved during an exposure process during which a pattern on the reticle can be formed on a wafer.

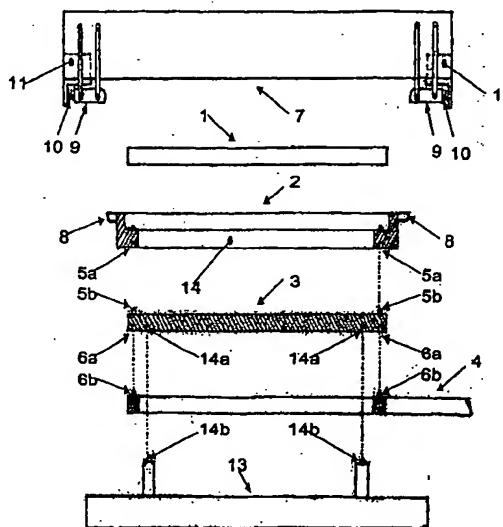


FIG. 1

BEST AVAILABLE COPY

EP 1 341 042 A3



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 03 00 3288

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	US 4 248 508 A (WATKIN THEODORE) 3 February 1981 (1981-02-03) * the whole document *	1-4, 6-13,15	G03F7/20 H01L21/00 G03F9/00
X	US 2002/021781 A1 (CHIBA KEIKO ET AL) 21 February 2002 (2002-02-21) * paragraph [0039] * * paragraph [0042] - paragraph [0045]; figures 1,2A-C * * paragraph [0093] - paragraph [0095]; figure 6 *	1,4,6,9	
X	JP 02 098122 A (MITSUBISHI ELECTRIC CORP) 10 April 1990 (1990-04-10) * abstract *	1	
A	US 2001/031404 A1 (CAMINOS CARLOS G ET AL) 18 October 2001 (2001-10-18) * paragraph [0018] * * paragraph [0037] - paragraph [0039] *	1-15	
A	US 6 239 863 B1 (PUERTO SANTIAGO DEL ET AL) 29 May 2001 (2001-05-29) * abstract *	1-15	TECHNICAL FIELDS SEARCHED (Int.Cl.7)
A	EP 0 525 293 A (SAIKI MINORU) 3 February 1993 (1993-02-03) * column 6, line 34 - column 7, line 42 *	1-14	G03F H01L G03B B23Q C23C
A	US 4 549 843 A (JAGUSCH PETER R ET AL) 29 October 1985 (1985-10-29) * the whole document *	1-15	
----- -/--			
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 9 February 2004	Examiner van Toledo, W
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons</p> <p>& : member of the same patent family, corresponding document</p>			

EPO FORM 1503 (03.02.2004)



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 03 00 3288

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A	US 5 611 452 A (JAIN SUDHIR ET AL) 18 March 1997 (1997-03-18) * the whole document *	1-15,17, 19-21,24	
X	* column 6, line 48 - line 57; figures 1A,1B,2,3,6 * * column 7, line 24 - line 55 * -----	16,18, 22,23	
A,P	US 2002/092144 A1 (BERCAW CRAIG ALAN ET AL) 18 July 2002 (2002-07-18) * paragraph [0027] - paragraph [0031] * -----	19-21	
A	EP 0 582 018 A (IBM) 9 February 1994 (1994-02-09) * page 25, line 38 - page 28, line 35; claim 1; figures 12A-120 * -----	24	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
Place of search Munich		Date of completion of the search 9 February 2004	Examiner van Toledo, W
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

EPO FORM 1503 (03.82) (P/C/C01)



European Patent
Office

Application Number

EP 03 00 3288

CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing more than ten claims.

- ☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claim(s):
- ☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

- ☒ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.
- ☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.
- ☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:
- ☐ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:



European Patent
Office

LACK OF UNITY OF INVENTION
SHEET B

Application Number
EP 03 00 3288

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 1-14,15

Two-part cover and alignment means for continuous protection of a reticle from contaminants within the exposure apparatus by reducing particle settling on the reticle, and by reducing particle generation due to transfer friction and reticle sliding friction

2. claims: 16-23

A pod/loadlock to protect a reticle from contaminants during transport from outside to within the exposure apparatus by controlling gas flow and method of using the same

3. claim: 24

System comprising of a box and separate loadlock to provide mechanical transport of the mask through several vacuum environments

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 03 00 3288

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

09-02-2004

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4248508 A	03-02-1981	DE 3025829 A1	19-02-1981
		JP 1024297 B	11-05-1989
		JP 1539017 C	16-01-1990
		JP 56024335 A	07-03-1981
US 2002021781 A1	21-02-2002	JP 9306820 A	28-11-1997
		JP 9320935 A	12-12-1997
		US 6317479 B1	13-11-2001
JP 02098122 A	10-04-1990	NONE	
US 2001031404 A1	18-10-2001	US 6251543 B1	26-06-2001
US 6239863 B1	29-05-2001	AU 1630001 A	23-04-2001
		EP 1226471 A2	31-07-2002
		JP 2003511868 T	25-03-2003
		WO 0127695 A2	19-04-2001
EP 0525293 A	03-02-1993	JP 2534167 B2	11-09-1996
		JP 4369824 A	22-12-1992
		EP 0525293 A1	03-02-1993
US 4549843 A	29-10-1985	EP 0121969 A2	17-10-1984
US 5611452 A	18-03-1997	US 5469963 A	28-11-1995
		JP 6196545 A	15-07-1994
US 2002092144 A1	18-07-2002	US 2004007581 A1	15-01-2004
EP 0582018 A	09-02-1994	EP 0582018 A1	09-02-1994
		AT 129360 T	15-11-1995
		BR 9302933 A	15-03-1994
		CA 2094436 A1	05-02-1994
		DE 69205571 D1	23-11-1995
		DE 69205571 T2	13-06-1996
		ES 2079829 T3	16-01-1996
		JP 2641377 B2	13-08-1997
		JP 6104333 A	15-04-1994
		KR 9706725 B1	29-04-1997
		US 5382127 A	17-01-1995

EPO FORM P443B

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82